**Research framework for AfricaRISING**

***Preliminary note: This document details the research framework proposed to be implemented in the context of AfricaRISING. At present, it does not describe the full program, which will require a program-wide log-frame, including specific outputs, milestones, etc. as well as documentation of the Program M&E, Communications and Management. The current framework is expected to be integrated into a manual that will cover the overall program.***

**1. Summary**

This document describes the principles and implementation of a framework that will be used to guide the research that will be undertaken by the three AfricaRISING projects in West Africa, Eastern and Southern Africa and the Ethiopian highlands. In developing this framework we wished to outline approaches that would be robust in delivering against the programme’s purpose of pathways out of hunger and poverty through sustainable intensification. However, it is important that these approaches should not be too prescriptive and allow individual research teams to build on their past experience and to exercise their creativity in developing workable solutions to the problems associated with this purpose. Key features of the framework are:

* It is deign to test a set of research hypotheses that are carefully linked to the overall outputs and developmental outcomes of the AfricaRISING programme.
* It incorporates activities that will make it problem focused and demand-driven whilst supporting the integration of potential innovations from a wide range of sources (past research, ongoing adaptive research and indigenous solutions).
* It is built out of a set of guiding principles that the group who developed believe will help to ensure that it generates research outputs that are effectively targeted on development needs and are feasible for target farm households to implement. These principles include an appreciation of household diversity, differing and multiple objectives, complementarity of interventions / innovations and the dynamic nature of intensification at the household level.
* It is implemented at several levels with core research outputs that are likely to be common across the programme, activities that may or not be relevant to all the individual research questions posed by the individual projects and methods and tools that can be applied flexibly as dictated by these individual research activities and the context in which they are carried out.
* Scaling is embedded in the program, at a pilot level – within the programme’s budget – and beyond through co-development of investment plans with development agencies.

We believe that this framework will be effective in incorporating the whole continuum from problem identification and targeting through participatory technology evaluation and adaptation to scaling It relates to clear objectives and outputs built on testable and refutable hypotheses.

**2. Context: Opportunities and constraints**

Rural livelihoods in the humid and savannahs zones of west and east Africa are based on smallholder crop and livestock production systems. As a result of population growth and increasing food and feed needs, the farming systems are in transition. They vary from sole crop and livestock enterprises to mixed crop-livestock smallholder systems, with considerable interaction between the two.

[Jerry: to add]

**1.1. Constraints**

Productivity is generally low due to limited access to improved technologies, input and output markets, pro-poor policies and effective institutions, and various forms of environmental degradations. This has increased food insecurity, risks, and vulnerability of households and individuals, and the disadvantaged groups particularly woman in rural areas to make a living.

The principal constraints to smallholder rainfed crop production are: access to land and water resources; dependence on rainfall, which can be erratic and unpredictable, exacerbated by recurrent droughts; lack of knowledge of improved and appropriate technologies to increase productivity or expand the range of crops and crop rotations; lack of inputs, particularly quality seed; incidence of pests, diseases and weeds and lack of control measures; high storage losses; lack of employment or other income generating activities outside the growing season; lack of access to formal credit; and, because of low yields and low incomes, a limited capacity to accumulate capital to expand their production enterprises. Overstocked and over-grazed communal grazing lands have resulted in loss of bio diversity, land cover and soil erosion.

[Earlier points raised: Farm-level: - Low and inefficient production (varieties, pest and diseases, lack of nutrients), nutrient mining, degradation; Low labour use efficiency (lack of mechanization), - Environmental issues (degradation, etc), - Lack of knowledge, - ‘Hungry harvests’, - Limited resource base (capital, land tenure, labour, inputs); Community-level: - Limited uptake of technologies (lack of knowledge, heterogeneity, etc), - Lack of equity, empowerment, - Climate change/variability; lack of capacity to respond to shocks and stresses; Institutional level: - Weak and institutions (markets, extension)]

1.2. Opportunities

Community-based, participatory research to identify and promote appropriate technological, institutional and policy options for the development of sustainable livelihoods and to build the capacity of the target communities to assure their own food security (self-reliance) through improved agricultural production, better resource management and alternative income generating activities. Also, growth in food/feed need and food diversification, improved technologies (production and post-harvest) and principles to address the above constrains offer opportunities at the farm level, whilst emerging environmental payment schemes (carbon payments) offer opportunities at the institutional level. Other opportunities to address the constrains include: investments input supply systems (seed, fertilizer), export markets (internal, regional and international) and multi-stakeholder partnerships.

[Earlier points raised: Farm-level: - Growth in staple food need and food diversification, - Technologies/principles to address above constrains.,- Post harvest improvements; Community-level: - Emerging opportunities for environmental payment schemes (e,g. carbon payments); Institutional level: - Investments in input supply systems (seed, fertilizer), - Internal, regional and international export markets- Partnerships]

**3. Purpose**

The program has the following purpose:

Provide pathways out of hunger and poverty for small holder families through sustainably intensified farming systems that sufficiently improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

This purpose is designed to ensure that AfricaRISING’s research contributes to the wider developmental aims of USAID’s Feed the Future Program.

*Note: purpose level indicators in the finalized logframe should reflect this*

**4. Objectives and Outcomes**

In order to emphasise the programme’s strong focus on delivering research outputs that contribute tangibly to developmental outcomes, we have differentiated the program objectives and outcomes into those that are focused mainly on research activities and those that are focused mainly on development. Moreover, the research hypotheses that have been developed as part of the framework have clear explicit linkages with specific programme objective and these are indicated in square parentheses after each objective [H1 – H4].

**4.1. Objectives**

4.1.1. Research-Evaluation of both the options and strategies for delivering the options to target beneficiaries

1. To identify and evaluate demand-driven options for sustainable intensification that accelerate progress toward rural poverty alleviation, improved nutrition and equity, and ecosystem stability [H1, H2, H3]

2. To evaluate, document and exchange experiences with processes and mechanisms for integrating and delivering innovations for sustainable intensification to facilitate their uptake beyond the Africa RISING action research sites. [H4]

4.1.2. Development

3. To improve smallholder farm households’ livelihoods so that they can move out of poverty and improve the nutritional status, especially of young children and mothers, while improving or maintaining ecosystem stability within Africa RISING action research sites. [H4] This reads like an impact statement

4. To facilitate partner-led dissemination of integrated innovations for sustainable intensification beyond the Africa RISING action research sites. [H4]

**4.2. Program-level outcomes**

*Note: How have these been designed to deliver against purpose and how do outputs feed in to them?*

4.2.1. Research

1. Integrated innovations used for intensifying farming practices of targeted types of households in a sustainable manner within identified development domains developed

2. Tools and approaches for identifying, evaluating and disseminating integrated innovations for sustainable intensification used for poverty alleviation and improving nutritional status of young children and mothers, while maintaining ecosystem stability validated.

3. The aggregated impact of integrated, innovative farming practices at the household level is used to improve the understanding of ecosystem stability (at the landscape level

) established.

4.2.2. Development

4. Small-holder farming households sustainably increase the overall productivity of their farms, and thus their agricultural output, income diversity, and improve nutrition and welfare especially young children and mothers, within the Africa RISING action research sites This is an immediate impact or outcome of the wholeproject.

5. Small-holder farming households experience increased resilience of their farming systems, and thus reduced vulnerability to adverse environmental and economic challenges within Africa RISING action research sites. Same as above

6. The development community increasingly uses innovative outreach and support approaches, and related data & knowledge management systems to design integrated innovations for sustainable intensification at the farm household scale immediate outcome of research outputs

**5. Guiding Principles and Conceptual Framework**

This section describes the guiding principles that drive the research for development agenda of AfricaRISING and the conceptual framework within which the AfricaRISING research themes are embedded.

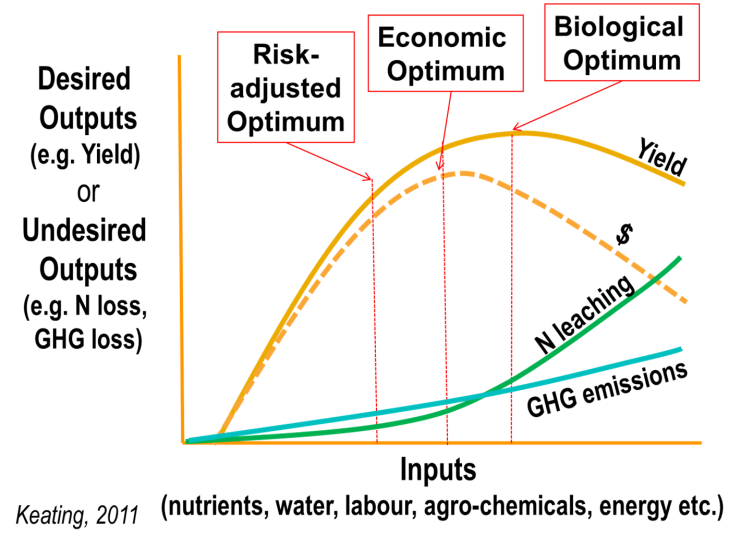
**5.1. Guiding principles**

5.1.1. The farm and household as focal domains

The farm household [[1]](#footnote-1)scale represents the focal domain of Africa RISING investments and activities. This domain reflects the scale at which household production decisions, gender and nutrition issues, and household welfare as well as soil health and productivity issues can be considered. It is conditioned by assets (e.g. land, labor, livestock, and financial resource endowments), livelihoods, production objectives and aspirations of households within a given regional and landscape context. Research activities at this scale must focus on understanding household needs and incentives in order to better support evaluation, adoption and adaptation of the most relevant interventions. Within the constraints and opportunities of the regional and landscape context, the goal of AfricaRISING is to offer menus of relevant and cost-effective integrated SI innovations [[2]](#footnote-2)that simultaneously advance household welfare and enhance sustainability. The household is equally the intervention domain of the Humidtropics program. I would suggest the inclusion of New Household Economics models ( de Janvrey and Sadoulet; Ironmonger etc) ,

5.1.2.Sustainable intensification

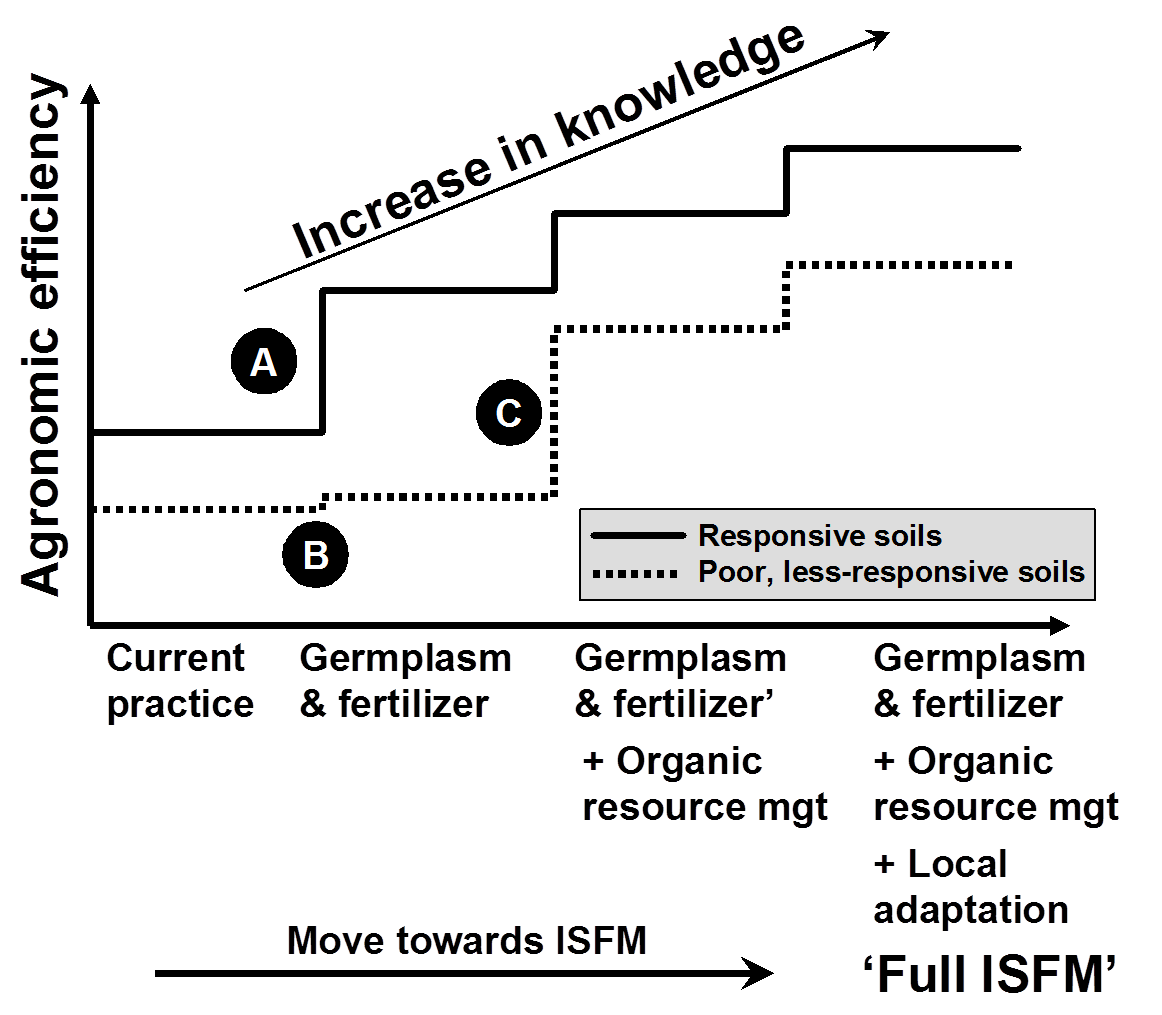
AfricaRISING aims at sustainable intensification of cereal-based farming systems. FAO defined ‘agricultural intensification’ as an ‘increase in agricultural production per unit of inputs (which may be labour, land, time, fertilizer, seed, feed or cash)’. More recently, ‘sustainable intensification’ has been defined as ‘producing more output from the same area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow of environmental services’. ‘Eco-efficiency’ was a concept first used in the business domain in the lead-up to the 1992 Rio Earth Summit. It was defined as, ‘creating more goods and services with ever less use of resources, waste and pollution’. Keating et al (2012) have sought to explore the conceptual underpinnings of eco-efficiency in agricultural systems and emphasize its multi-dimensional nature whereby any output measure (desired such as food production or undesired such as nutrient pollution or greenhouse gas emissions) is related to some measure of inputs (such as land, water, nutrient or labour) (Figure 1). The concept allows for relations between desired outputs (food production, labour employment) to be expressed in terms of undesired outputs (greenhouse gas emissions, risk, pollution etc). The concept also acknowledges the issue of risk aversion within the context of promoted integrated SI innovations. AfricaRISING will use agro-ecological intensification principles for the quantitative evaluation of such innovations and will develop tools for linking desired and undesired outputs in order to prioritize these and enable trade-off analysis. In the rest of the document it is understood that ‘sustainable intensification’ follows agro-ecological principles.



**Figure 1: Illustration of the principles underlying sustainable intensification. Source: Keating et al, 2012.**

5.1.3.Stepwise progress towards sustainable intensification

Ultimate intensification requires the adoption of various SI innovation components, each with their own challenges towards large-scale uptake. It has been demonstrated that farmers hardly ever take on simultaneously a suite of alternative or improved practices. AfricaRISING acknowledges this and will evaluate the ‘robustness’ and ‘riskiness’ of specific interventions aiming at intensification and develop pathways to integrate more components as households move up the intensification ladder. AfricaRISING also acknowledges that some components are required before other components can be promoted (e.g., there is no point in using fertilizer if a maize variety is not resistant to Striga in Striga-infested areas). Integrated Soil Fertility Management (ISFM), for instance, respects the principles of agro-ecological intensification and acknowledges that several steps can be taken to gradually move towards maximum agronomic efficiency of inputs used, the main goal of ISFM (Figure 2). ISFM also acknowledges that ‘moving towards full ISFM’ can only happen in combination with enhanced access to knowledge. A similar logic could apply to other dimensions of AfricaRISING, including livestock intensification or value addition.



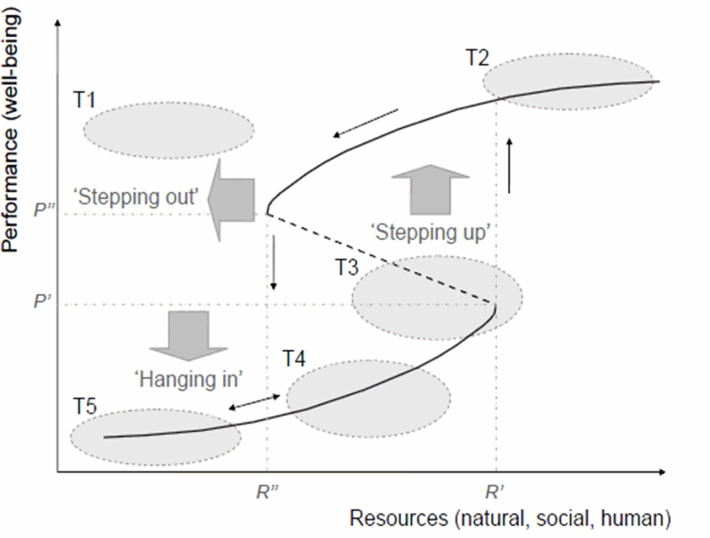
**Figure 2: Conceptual illustration of the principles underlying Integrated Soil Fertility Management (ISFM) as an illustration of the need to move towards sustainable systems in a stepwise approach. Source: Vanlauwe et al., 2011.**

5.1.4. Development domains comprising main drivers for intensification

Overall environmental conditions are expected to influence the options and pathways available to smallholder farmers to intensify their farming systems. Important divers towards intensification include high population densities, good access to markets, and appropriate agro-ecological conditions. Within the AfricaRISING sites, it is important to understand the current status of each of those drivers and construct development domains that encompass areas with similar conditions in order to ensure that scaling up processes and approaches are integrating this crucial information. Substantial experience exists with identifying such domains (Chamerlain et al., 2006) and AfricaRISING is going to take this logic a few steps further by identifying entry points towards intensification in line with the overall domain conditions and integrate these into dissemination approaches.

5.1.5. Farm household typologies and intensification pathways

Within rural communities, access to farming resources for households are variable and determine to a great extend the optionality of these households to intensify production and take risk. Household typologies can be constructed around the resource status and production objectives of farming households. We can hypothesize that the diversity of livelihood strategies can be described as alternative system states which dynamics exhibit non-linearity, irreversibility, and hysteresis, and transformability (Figure 3). We are, therefore, called to consider farming systems in the light of five possible broad household strategies from poverty and hunger: (i) intensification of production; (ii) diversification of agricultural productivities for increased output value; (iii) increased farm size; (iv) expansion in off-farm income; (v) and complete step out of agriculture. By considering the household diversity as alternate system states, we can identify pathways out of poverty. Targeting specific households having a specific set of resources and livelihood objectives will be a crucial strategy of AfricaRISING and forms one of the cornerstones of the overall hypothesis.



**Figure 3: Theoretical representation of the position of five household types (T1-T5) that are common in East Africa in a two-dimensional plain defined by resource endowment and performance (in this case, ‘well-being’). Source: Tittonell et al., 2005.**

5.1.6. R4D platforms[[3]](#footnote-3)for cooperation and co-learning towards greater impact [Note – we still need to agree on (i) the best term to describe partner interactions and (ii) whether there will be a testable hypothesis around platforms – my feeling is that it’s probably best to leave out experiementation related to the R4D platforms, keep this as a principle, and focus the scaling research on dissemination approaches only] I concur given the experience from FARA on proof of concept and impact of IAR4D

Since system interventions require the engagement of various research and development partners, operating in the context of specific components within these systems, proper means for meaningful and effective interactions are needed to prioritize, guide, and evaluate the various research and development processes within AfricaRISING. In line with the Humidtropics logic, R4D platforms will be constituted within specific development domains and will include private and public sector partners that are essential to deliver on system intensification at scale. These platforms will also organize the identification of critical entry points, the participatory evaluation of integrated SI innovations, and the co-learning events around AfricaRISING.

5.1.7.Identification and nature of critical entry points towards intensification

AfricaRISING is about sustainable intensification of cereal-based crop-livestock systems. Demand-driven[[4]](#footnote-4) entry points towards achieving this goal will be the result of the situation analysis, the ex-ante potential of certain interventions and technologies, and agreement between the partners constituting the R4D platforms. Such entry points could consist of technologies or technology components aiming at productivity enhancement (e.g., improved varieties, ISFM practices, water harvesting, livestock feed production), natural resource management (e.g., erosion control, agroforestry), or income generation (e.g., value addition, collective marketing), and most likely a combination of all the above. They can also include innovations related to social and institutional arrangements, eventually in combination with specific technology components. AfricaRISING will not aim at promoting ‘panacea’ technologies or technologies that are best under all farming conditions (see also the various hypotheses).

5.1.8.Integration of ethical principles in science for development activities

Since many activities involve the direct engagement of farming families and related collection of private information, existing guidelines on good practice while working with farming families will be adopted for all AfricaRISING activities.

**5.2. Conceptual framework**

AfricaRISING intervenes at the household level but acknowledges that households interact with and influence various dimensions beyond the household at the community, landscape, and regional level (Figure 4). Across the different countries, development domains will be constructed around existing ranges of three main drivers affecting intensification, i.e., population density, market access, and agro-ecological potential. Within these domains, farm typologies will be developed, and entry points towards sustainable intensification will be identified, based on the overall characteristics of a specific development domain and the resources available to a specific household. These entry points will be identified and evaluated, acknowledging the guiding research principles underlying AfricaRISING.

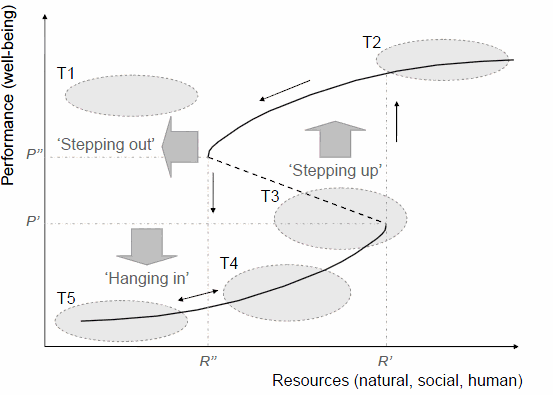
**House-**

**hold**

**Landscape,**

**Community**

**Region**



**Household typologies**

**Development domains**

*Markets*

*Extension*

*Infrastructure*

*Policy*

*Services*

*Common*

*resources*

*Ecosystem*

*Services*



*🡪 Population density*

*🡪 Market access*

*🡪 Agro-ecological potential*

**Low**

**High**

**R4D platforms**

**Action Research Sites**



**SI**

**Innova**

**-tions**

**Figure 4: Conceptual framework of AfricaRISING, highlighting the place of households in the overall rural landscape and the impact of large-scale (orange arrows) and household-level (brown arrows) drivers on the identification of specific sustainable intensification (SI) innovations through R4D platforms operating at Action Research Sites which are representative of the target regions and the farming communities therein. The blue central circle refers to the overall research approach (Figure 5) and the blue arrows moving up indicate the scaling activities beyond the Action Research Sites to the different target regions.**

**6. Research Design**

*Note: We may need to prioritize the hypotheses*

*Note: We also developed a hypothesis relating to the function of R4D platforms but this has been excluded as we have included platforms as a guiding principle for research that is more effectively targeted.*

**6.2. Research Hypotheses**

We have identified four program research hypotheses:

1. **Adoption and integration hypotheses**

***1.a. Adoption hypothesis***

Demand-driven innovations are adopted in preference to supply-driven innovations. Since the majority of adoption studies have confirmed this hypothesis, we could consider combining both adoption and integration hypotheses by looking at the more recent literature on joint and sequential adoption decisions.

***1.b. Integration hypothesis***

Innovations that mutually reinforce whole farm performance/productivity produce greater and more sustained benefits than the joint adoption of equally effective single use/purpose innovations.

1. **Trade-off hypothesis**

Tailoring sets of innovation options to the constraints and opportunities encountered in specific development domain-by-household type strata enhances the win-win outcomes of innovation use (e.g. reduces the scale of negative trade-offs between farm productivity and environmental integrity). I would argue that availing a basket of options that are mutually reinforcing as opposed to mutually exclusive would generate win-win outcomes. ( I recall a presentation by Paswel Phiri and a comments from Karen Brooks from IFPRI at the 28th ICAE in Brazil; “ paying small holder farmers for carbon sequestration could enhance their liquidity and generate effective demand for organic fertrilizer.”. Implication, market mechanisms could enhance adoption of environmental conservation and productivity enhancing technologies.

1. **Innovation sequencing and sustainable intensification pathways hypothesis**

The likelihood of innovation adoption resulting in sustainable intensification pathways over time is conditioned by the sequence in which those innovations are integrated and applied.

1. **Scalability hypothesis**

A stratified approach to targeting and evaluating SI-related innovations will increase the relevance and scalability of findings from action research sites to similar strata elsewhere (e.g. to similar development domains and households typologies in other locations).

These hypotheses provide a focus for the three projects’ research activities without being over-prescriptive about what the latter should actually target. We anticipate that projects will formulate their own research hypotheses at the next level of detail but that each of these will demonstrably contribute to the testing of at least one program hypothesis.

**6.3. Research Outputs**

*Note: The research outputs are what we were originally calling “research components” and are at the core of the research framework figure inserted here.*

The program’s research framework is designed around four research outputs. The three core outputs that capture the identification, adaptation and scaling of SI technologies are: We could consider phrasing these as tangible deliverables from research activities e.g.

1. Viable options for intensification, taking into account existing knowledge, practices (innovations) identified, prioritized, tested/ validated.
2. Appropriate mechanisms and approaches for scaling out viable options for intensification identified and validated
3. A results measurement and learning framework capable of generating real time information on inputs, processes, outcomes, impacts and lessons for performance improvement developed and tested.

* **Research output 1:** Situation Analysis and Programme-wide Synthesis. Includes the activities that are necessary to ensure that project activities are able to characterise and stratify target communities effectively so that promising interventions are identified and inappropriate interventions rejected.
* **Research output 2:** Integrated Systems Improvement. This is based on the basic principle of participatory technology development and / or identification. This component specifies a fundamental need for projects to allow for the identification of existing sound practices within communities that might be more widely propagated, the adaptation of these and other, exogenous innovations and the more effective combination of innovations from multiple sources.
* **Research output 3:** Scaling and Delivery of Integrated Innovation. The first two components will generate integrated technology combinations that are more effectively targeted on farmer’s real development needs. This component recognises that, even where such technology combinations can be identified, the approaches used for scaling them out may not always be effective and seeks to redress this shortcoming.

In addition we have a specific M and E output that seeks to strengthen the effectiveness of the process defined by outputs 1 -3:

* **Research output 4:** Integrated M and E Process. The programme will aim to wrap the three process-oriented outputs in a firm M and E framework that will ensure first two components will generate integrated technology

These research outputs are at the core of the framework and define the key elements of the AfricaRISING programme process (as implemented by each of the three component projects) (Figure 5).

Nutrition

Impact pathways

Indicator databases

and tools

Impacts on gender

relationships

Redressing gender

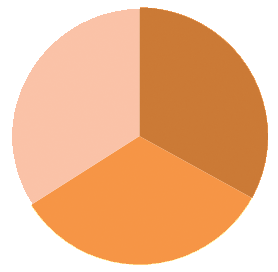
imbalances

Outcome mapping

Early impact assessment

**M & E**

Evaluate drivers of change



Compendium

of tools

and methods

Compendium

of tools

and methods

Compendium

of tools

and methods

Site selection

Characterisation

Typologies

Problem ID

Options

Entry points

Research teams

Modeling

Participatory evaluation

Adaptation

Combination

Farm-level impacts

Sustainability / resilience

DS tools

Meta analysis

Forecast replicability

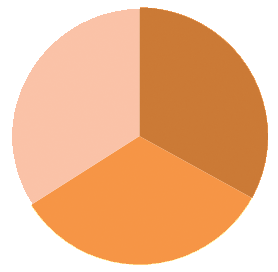
Validate replicability

Scaling approaches

Aggregated impacts

Implemntation support

Synthesis



**RO 1**

Situation analysis and programme-wide synthesis

**RO 2**

Integrated systems improvement

**RO 3**

Scaling and delivery

Shocks and stresses

Gender

Policy

**Figure 5: Schematic representation of the Programme’s Research Framework.**

**6.3. Research Activities**

*Note: These are all embedded in one of the research outputs.*

Each research output will be delivered by a set of activities that are likely to be needed if projects are to deliver against the programme’s purpose and objectives. However, the framework is not prescriptive about how each activity is actually carried out. The aim is to develop a compendium of methods that might be used to deliver on each activity within framework (depending on the more specific research questions developed by the projects themselves). The research activities are described in detail below (against the project output that each will help to deliver). They are also indicated in the blue circle of Figure 5 and represent the continuous process by which the project will identify adapt and deliver integrated options for SI to farm households.

Research Output 1 Activities: Situation analysis and program-wide synthesis

Each **project-site** will be stratified by geographic domains (development domains). SI interventions will be matched to specific to domains and household typologies. Interventions will be tested within action research sites within priority/representative action research sites.

**1.1. Mega-site stratification by ‘development domains’ within and across countries**: Development domains are determined by the intersection of three attributes (agro-ecological potential, market access, and population density). The specific metrics of each those attributes and the thresholds distinguishing e.g., high/low states, will be determined with each mega-site team (or country?). IFPRI will additionally maintain a SSA-wide representation of development domains.

**1.2. Prioritize mega-site strata geographical units (e.g. woredas in Ethiopia) and compare/contrast with researcher selected research locations:** Identify which specific geographical units to target according to key targeting criteria (e.g., welfare, sustainability, farming systems, degradation, GoE & USAID priority). Juxtapose with current actual action research sites and prepare a schedule of recommended future sites to ensure representativeness of action sites across mega-site

**1.3. Farm household typologies**: Targeting farmers with similar characteristics that are likely to determine the likelihood of adoption of particular combinations of innovations.

**1.4. Problem identification and pathways for addressing these constraints within domain/typology**: Identify pathway entry points

**1.5. Inventorize innovations:** On-the-shelf, indigenous knowledge, currently being promoted, etc, characterized by domain and typology applicability

**1.6 Ex-ante potential of options** Using participatory and modeling approaches, in consultation with R4D platforms.

**1.7. Priority setting and planning for integrated systems improvement**:

**1.8. Program-wide synthesis and co-learning**:

Research Output 2 Activities: Integrated systems improvement

**2.1. Identification of research teams within R4D platforms:** Within the R4D platforms, constituted around critical entry points, research teams will be identified to lead innovation activities related to system improvement. Although all platform members will be engaged at one stage in research activities, this team will provide overall leadership in terms of evaluating and validating the agronomic, economic, and environmental performance of entry points, generate M&E data, adapt and use models, translate information in knowledge accessible to all platform members, amongst others.

**2.2. Identification modeling and decision support tools for the ex-ante technology identification, trade-off analysis, evaluation of the ex-ante sustainability and resilience of options, and guiding future research**: Several decisions, related to the identification of critical entry points, anticipating their potential benefits, and evaluating trade-offs will require farm-level modeling tools. Specific indicators that point towards enhanced sustainability and resilience, e.g., to climate change, will be monitored for the various evaluation and validation activities. Specific long-term monitoring sites will be established to gather the necessary information on the dynamics of these indicators as related to the options evaluated. To fast-track the identification of best options in the context of existing development domains and household typologies, decision support tools will be developed. These are expected to be a combination of formal modeling tools, compendia of validated best practices, ‘rules-of-thumb’, amongst other.

**2.3. Participatory evaluation and adaptation of appropriate combinations of technologies and interventions**: Multi-locational adaptive research campaigns will be organized to evaluate and adapt promising innovations/technologies and interventions for different farm typologies and eventually combine several of these towards enhanced SI. Combining several components for intensification has the potential to create positive interactions between these. Experimental designs and methods (to be documented) will ensure that such interactions can be quantified and evaluated.

**2.4. Addressing new research challenges and opportunities emerging from the activities**: It is anticipated that new research issues will be identified through the M&E framework while testing anticipated best options at scale. Such research challenges, when relevant, will be addressed through specific interventions, eventually including greenhouse and on-station activities.

Research Output 3 Activities: Scaling and Delivery

**3.1. Assess scalability of integrated innovations (meta-analysis of options)**  A specific set of targeted innovations identified as promising will be assessed for scalability using a range of methods, for example, meta-analysis, GIS, modeling or literature survey with development agencies.

**3.2. Identify and develop (where necessary) scaling approaches for targeted integrated innovations that are identified to have potential for scalability.** GIS and spatial econometric modeling and hierarchical meta-modeling approaches will be applied to analyze data the impact of integrated SI innovations at different sites outside the testing environment. Meta-modeling approaches will be used to predict the replicability of the SI innovations in other sites and extrapolate results outside the current geographically targeted areas. Crop growth simulation models such as DSSAT and APSIM will be calibrated and applied to develop site specific extension messages that could be out-scaled to small-holder farmers. Extension messages are often developed for large regions, not taking into account the variability in soils, microclimates, and socio-economic conditions within those regions. The development and fine-tuning of decision support tools (DST) for small-holder agriculture can help with the diagnosis and analysis of problems and opportunities in food production systems and lead to increased productivity. Such tools will be particularly flexible and powerful when integrated with Geographic Information System (GIS) tools. The DST can be used at various stages of decision-making including site selection, evaluation of various management options, and extrapolation and scaling-out of results obtained in limited area to other areas.

**3.3. Pilot test scaling approaches from action sites within project area.** Alternative approaches for scaling up and scaling out SI innovations will be pilot tested. These will vary from market to institutional-based approaches. Market-based approaches will be tested in situations where the technology is embodied in inputs; access is through agro-dealers; farmers have purchasing power; and yield is dependent on farmer management. Institutional-based approaches will be tested in situations where the technology is embodied in improved management; technologies are information and labor intensive; multiple constraints exist; and there is a productive base for introduction of inputs. Systematic monitoring and evaluation and quasi-experimental methods will be used to assess what approaches work, where, for whom and for how much.

**3.4. Develop costed templates for scaling by development investors.** In partnership with development agencies develop a costed program of work for scaling across a target area.

Where investors take up scaling activities:

**3.5. Evaluate aggregated impact of household level interventions at landscape scale and beyond.**

**3.6. Evaluate/validate scaling approaches for integrated systems.**

Research Output 4 Activities: Monitoring and Evaluation

**4.1. Participatory impact pathway analysis and identification of indicators for monitoring impacts on productivity, resilience, health and nutrition, environmental effects, gender equity, etc** :

***Identification of indicators for monitoring impacts on poverty alleviation, health and nutrition, gender equity, productivity and environmental services (Obj. 1 & 3)***

The learning oriented results measurement system will be developed for the project. To this end, an inclusive stakeholder process will be used to identify the necessary activities /processes and the associated results to be generated. An impact pathway/results chain and the key performance indicators for each result will be developed in a participatory manner. More importantly, a results measurement framework that incorporates farmer/beneficiary assessment and the objective impact evaluation approaches will be developed. A participatory monitoring and evaluation approach will be used to identify indicators for assessing the project activities, outputs, outcomes and impacts. The approach will involve engaging multi-stakeholders through the R4D platforms. Stakeholders will be engaged during the early phase of the project through diagnostic surveys,, focus group discussions and individual interviews to define practical impact pathways. This information will be synthesized and used to derive appropriate indictors for monitoring progress during the different project cycles. The indicators will be monitored to assess returns to investment and evaluate progress towards meeting set program objectives. Both internal and external evaluation systems will employed to ensure effective lessons feedback during project implementation. The participatory monitoring and evaluation will be operationalized through agreed annual work plans, assigned responsibilities closely aligned with budgets.

**4.2. Development of a program-wide database and geo-referenced data collection tools for assessing the indicators in time**: I suggest that this be included as part of the Results Measurement framework

**Development of program-wide data collection instruments and database for assessing indicators in time (Objs. 1-4)**:

Online geo-referenced electronic data bases will be developed to capture, store and track the progress of research components using the M & E indicators. The data base will be used to monitor overall progress and for the mid-term and final evaluation of the project.

**4.3. Assessment of the impact of interventions on gender relations and equity and redressing gender imbalance (too specific at a program level; we cannot isolate gender)**:

**Assessment of the impact of interventions on gender *on poverty alleviation, health and nutrition, gender equity, productivity and environmental services***:

Gender issues will be analyzed using appropriate tools such as the Harvard analytical and Caroline Moser’s frameworks. Gender analysis will be conducted on the roles, livelihood strategies, constraints, and preferences of men and women, the youth, and marginalized groups in different socio-cultural systems. This will help identify gender-differentiated technology needs, choices, constraints, and test mechanisms that enhance technology targeting, delivery, and equitable access for greater impact on both men and women. This will permit stakeholders to validate and initiate action on successful SI innovations that are likely to work in other contexts and which can be scaled up.

**4.4. Outcome mapping and early impact assessment:**

***Outcome mapping and early impact assessment***

Outcomes mapping monitoring and evaluation approach will be used to benchmark initial conditions and to progressively monitor behavioral change for different stakeholders and their boundary partners. Progress markers at different levels (expect, like and love to see) will be set at the beginning of the pogram and will be monitored during the implementation of the program. initial adoption of SI innovations and to assess whether or not these perform as anticipated. The methods will be used to identifying ways of improving performance in order to address better the needs of non-adopters and accelerate adoption.

**4.5 Evaluation of the main drivers affecting uptake**:

***Identification and evaluation of the main drivers affecting uptake of SI innovations***

Multilevel generalized linear modeling will be applied to identify and estimate the main drivers at the farm household, community/landscape and regional levels affecting uptake and impact. For example, the effect on household plot level crop yield  can be modeled as

These models will be estimated and tested to identify the complementarity and substitutability and therefore tradeoffs among different drivers

**6.4. Timing of Research Activities**

The framework is not intended to be prescriptive at this level of detail but the following illustrates the kind of sequencing that we might expect to see if the framework is being effectively applied to the project-level research questions.

[To add: GANTT chart]

*Note: this would describe how activities (within the blue circle relate to each other in terms of timescale)*

1. ‘Farm households’ within AfricaRISING are defined as a group of people that work and live at least half of the time on the farm and operates under the leadership of a household head. [still work in progress – although for East Africa this would work – we should probably have a final definition during the baseline activities] [↑](#footnote-ref-1)
2. ‘Integrated SI innovations’ refers to ‘Integrated Innovations for Sustainable Intensification’ and can include (combinations of) technological innovations (e.g., improved varieties, appropriate fertilizers, better agronomic practices), social (e.g., collective action for NRM or marketing), or institutional innovations (e.g., value chain efficiency improvements). [↑](#footnote-ref-2)
3. The term ‘R4D platforms’ refers to ‘Research for Development platforms’ that are defined as partnerships constituted around specific entry points - often organized around specific value chains - that have a specific agenda to which all partners contribute and that are committed to co-learning. The geographical range in which a R4D platform operates can vary and depends on the geographical scope of the entry point but typically encompasses at least 2,000 – 5,000 households. [work in progress!] [↑](#footnote-ref-3)
4. ‘Demand-driven entry points’ refers to entry points that respond to problems identified and/or requests made by the target farming populations. Note that the scope of a specific problem or request (e.g., low soil fertility) is often broader than the specific SI components (e.g., the use of fertilizer) and that specific SI components include technologies and innovations that are new to a specific farming community. [↑](#footnote-ref-4)